

REMARKS

Claims 57-72 are pending in the present application. Claims 57-72 have been rejected under § 103 as being unpatentable over Koinuma 4,451,802 (Koinuma) in view of King 6,300,827 (King), Engbretson 5,311,150 (Engbretson), Dudley et al. 5,144,133 (Dudley) and Lu et al. 6,009,023 (Lu).

New claims 73-76 have been added. Claims 57-62 have been canceled to minimize claim fees.. Applicants still assert that the canceled claims are patentable over the cited prior art, but have been canceled to facilitate expeditious prosecution and minimization of claims fees.

New independent claim 73 recites a method of providing a CMOS RF power amplifier for a wireless transmission system comprising "forming input stage circuitry on an integrated circuit, wherein the input stage circuitry includes one or more devices having a first gate oxide thickness," "forming output stage circuitry on the integrated circuit, wherein the output stage circuitry includes one or more devices having a second gate oxide thickness," "selecting the thickness of the first gate oxide based on desired speeds of devices in the input stage circuitry and tolerable breakdown voltages of devices in the input stage circuitry," and "selecting the thickness of the second gate oxide based on desired speeds of devices in the output stage circuitry and tolerable breakdown voltages of devices in the output stage circuitry."

As mentioned above, the previously presented claims have been rejected under § 103 as being unpatentable over Koinuma in view of King, Engbretson, Dudley and Lu. When rejecting the previously presented claims, the Examiner takes the position that it would have been obvious to combine the teachings of Koinuma, King, Engbretson and Dudley, that is, to replace the load of Koinuma with a wireless transmission/reception system taught by King, to substitute the FET structure of Engbretson for the bipolar elements of Koinuma, and to replace the amplifier of

Koinuma with a CMOS based unit like Dudley. The Office Action admits that the above combination of references is silent on mentioning the thicknesses of input and output stage devices. However, the Office Action then alleges that, using the teachings of Lu, it would have been obvious to make the oxide of the output stage thicker than the lower voltage input stage. (Office Action page 5).

Applicants submit that the combination of Koinuma, King, Engbretson, Dudley and Lu would not have made the claimed subject matter obvious to a person having ordinary skill in the art. For example, none of the cited references teach elements of new claim 73, such as "selecting the thickness of the first gate oxide based on desired speeds of devices in the input stage circuitry and tolerable breakdown voltages of devices in the input stage circuitry, " or "selecting the thickness of the second gate oxide based on desired speeds of devices in the output stage circuitry and tolerable breakdown voltages of devices in the output stage circuitry." Lu appears to be the only cited reference that even mentions gate oxide thicknesses. Lu teaches a DRAM structure employing multiple thickness gate oxide.

As asserted in previous arguments, if one skilled in the art were to attempt to design the power amplifier of Koinuma to be used in the wireless transmission/reception system of King, using CMOS technology, as in Dudley, it would not be obvious to combine such a design with the teachings of Lu. Designing an RF power amplifier using CMOS technology presents significant challenges. For example, in typical RF designs, it is usually desirable to use the fastest and most efficient devices possible on an integrated circuit. With respect to the thickness of gate oxide devices, thinner gate oxide devices will typically perform faster and better than thicker gate oxide devices. This consideration would tend to make a circuit designer use the smallest gate oxide thickness available (since thin gate oxide devices are typically faster and more efficient).

Therefore, it would be counter intuitive to also use larger gate oxide thicknesses in an RF power amplifier, since they would tend to lower performance and efficiency. There appears to be no teaching in the cited references to select gate oxide thicknesses based on desired breakdown voltage levels of devices in an input stage and in an output stage of a power amplifier. Therefore, Applicants believe that it would not be obvious for one skilled in the art to combine the teachings of Lu with the other references, since using thicker gate oxide devices in the combination would appear to decrease the performance of the RF power amplifier.

For at least these reasons, applicant asserts that new claim 73 is allowable over the cited prior art. Since dependent claims 74-76 depend from new claim 73, it is also believed that these claims are allowable over the cited prior art.

Claim 63 recites a method of providing a complementary metal oxide semiconductor (CMOS) RF power amplifier for a wireless transmission system comprising "using devices with a first gate oxide thickness to form RF power amplifier input stage circuitry," "identifying a breakdown voltage level for devices used in the input stage circuitry," "selecting the first gate oxide thickness for the devices used in the input stage circuitry based on the identified breakdown voltage level for devices used in the input stage circuitry," "using devices with a second gate oxide thickness to form RF power amplifier output stage circuitry," "identifying a breakdown voltage level for devices used in the output stage circuitry," and "selecting the second gate oxide thickness for the devices used in the output stage circuitry based on the identified breakdown voltage level for devices used in the output stage circuitry, wherein the first gate oxide thickness is less than the second gate oxide thickness."

Applicants assert that claims 63-67 are patentable over the cited prior art. For example, the cited references, alone or in combination, do not appear to teach selecting gate oxide

thicknesses based on identified breakdown voltage levels of devices in input stage circuitry and in output stage circuitry of an RF power amplifier.

Claim 68 recites a method of providing a cellular telephone apparatus comprising "providing a transceiver for transmitting and receiving signals," "forming an RF power amplifier using a complementary metal oxide semiconductor (CMOS) device," "coupling the RF power amplifier to the transceiver," "using devices with a first gate oxide thickness to form input stage circuitry for the RF power amplifier," "using devices with a second gate oxide thickness to form output stage circuitry for the RF power amplifier," "selecting the first gate oxide thickness based on identified breakdown voltage levels of devices in the input stage circuitry," "selecting the second gate oxide thickness based on identified breakdown voltage levels of devices in the output stage circuitry, wherein the first gate oxide thickness is less than the second gate oxide thickness," and "coupling an antenna to the RF power amplifier and the transceiver for transmitting and receiving signals."

Applicants assert that claims 68-72 are patentable over the cited prior art. For example, the cited references, alone or in combination, do not appear to teach selecting gate oxide thicknesses based on identified breakdown voltage levels of devices in input stage circuitry and in output stage circuitry of an RF power amplifier.

For at least the reasons set forth above with respect to new claim 73, applicant asserts that claim 68 is allowable over the cited prior art. Since dependent claims 69-72 depend from claim 68, it is also believed that these claims are allowable over the cited prior art.


It is respectfully submitted that all claims are patentable over the prior art. It is further more respectfully submitted that all other matters have been addressed and remedied and that the application is in form for allowance. Should there remain unresolved issues that require adverse

action, it is respectfully requested that the Examiner telephone Bruce A. Johnson, Applicants' Attorney at 512-301-9900 so that such issues may be resolved as expeditiously as possible.

Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 to deposit account number 50-3864 (Johnson & Associates).

9/13/10
Date

Respectfully Submitted,


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